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# EUROPEAN PATENT APPLICATION

21 Application number: 89116298.4

51 Int. Cl.<sup>5</sup>: B65F 3/00 , B65F 3/24

22 Date of filing: 04.09.89

30 Priority: 16.09.88 IT 219858

43 Date of publication of application:  
21.03.90 Bulletin 90/12

34 Designated Contracting States:  
AT BE CH DE ES FR GB LI LU NL SE

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54 Motor vehicle for urban refuse collection.

57 A motor vehicle for refuse collection comprising a collection bin (2) divided longitudinally into two chambers (3, 4), with each of which there is associated a rear closure door (3A, 4A), said doors (3A, 4A) being separate from each other and operable independently of each other.

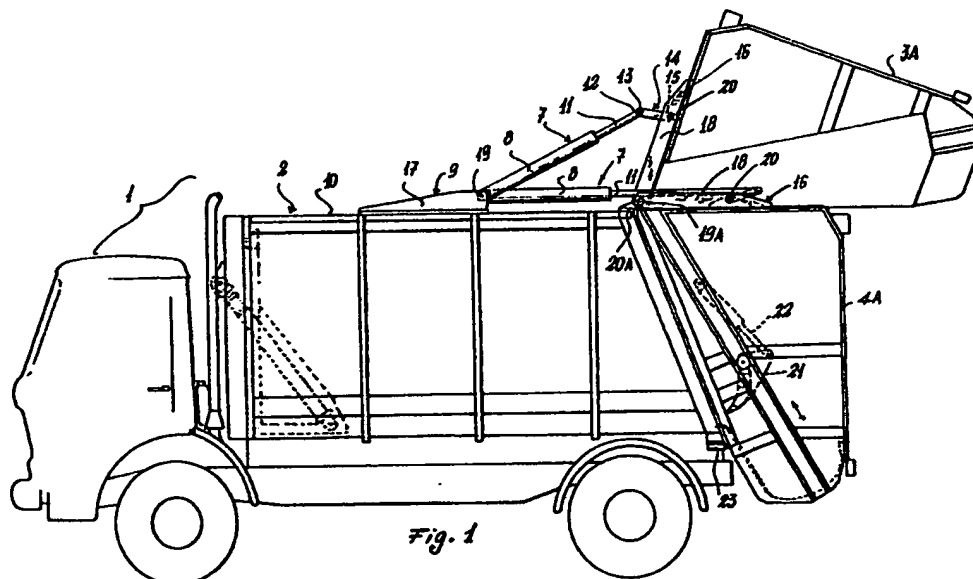


Fig. 1

## MOTOR VEHICLE FOR URBAN REFUSE COLLECTION

This invention relates to a motor vehicle for urban refuse collection comprising a collection bin divided into two chambers.

Such a vehicle enables sorted refuse such as glass and burnable refuse to be simultaneously collected.

A known type of motor vehicle with its collection bin divided in the said manner enables part of the sorted refuse to be discharged by normal tip-pers when collection has been completed, and the second batch of refuse to be taken out laterally through a further door.

However such a vehicle has considerable drawbacks, including the difficulty of manoeuvring in narrow streets, in which automobiles are also often parked.

Another type of motor vehicle provided with a two-chamber bin has only a single rear closure door.

In this vehicle, although during collection there is separation between two types of refuse as a result of sorting carried out by the collection personnel, the refuse is not kept completely separate during its discharge. In this respect, on opening the rear door during discharge by operating the expulsion cylinders, at least part of the initially separate refuse batches become mixed.

An object of the present invention is therefore to provide a motor vehicle for urban refuse collection which enables the refuse to be sorted in a simple and reliable manner during its collection and to be kept separated even during its discharge.

This and further objects which will be apparent to the expert of the art are attained by a motor vehicle for urban refuse collection of the aforesaid type, characterised by comprising a rear closure door associated with each of the two chambers, said doors being separate from each other and operable independently of each other.

The present invention will be more apparent from the accompanying drawing, which is provided for non-limiting indicative purposes only and in which:

Figure 1 is a side view of the motor vehicle constructed in accordance with the invention;

Figure 2 is a plan view of the vehicle of Figure 1;

Figure 3 is a rear view of the vehicle of Figure 1.

Said figures show a motor vehicle 1 for urban refuse collection.

Said vehicle 1 is provided with a collection bin 2 divided longitudinally into two chambers 3 and 4. Said chambers 3 and 4 are separated from each other by a wall 5 and are each provided with a

usual expulsion chamber 6. Said chambers 3 and 4 can have identical or different volumes.

According to the invention each chamber 3 and 4 is provided with its own door 3A and 4A respectively, the dimensions of which (in terms of width) correspond to those of said chambers. In Figure 1 in particular, one (3A) of the two doors 3A and 4A is shown in its open position for the discharge of the refuse collected in the chamber 3, while in Figures 2 and 3 said doors 3A and 4A are shown in their closed position.

To open each door 3A and 4A, with these latter there are associated hydraulic lifting devices 7 comprising cylinders 8 hinged to fixed parts 9 rigid with an upper part 10 of the collection bin 2, in each of which a piston 11 moves. Each piston 11 is hinged at one end 12 to one end 13 of an arm which is hinged at its other end 15 to a fixed part 16 rigid with the doors 3A and 4A.

Specifically, said fixed parts 9 and 16 are formed respectively from parallel flanges 17 and 18 connected together by pins 19 and 20. In this manner, said cylinders 8 can rotate about the pins 19 of the flanges 17 of the fixed parts 9, and the arms 14 can rotate about the pins 20 of the flanges 18 of the fixed parts 16 during the opening of the doors 3A and 4A.

More particularly, in the embodiment described herein (see Figure 3), two hydraulic lifting devices 7 are provided for the larger-dimension door 3A, whereas only one device 7 is provided for the smaller-dimension door 4A. This however is not binding for the purposes of the invention, as the number (one or two) of lifting devices 7 associated with the doors 3A and 4A can vary as the dimensions of these latter vary.

Finally, to allow the doors 3A and 4A to be opened, these are hinged at 19A to the rear ends 20A of the upper part 10 of the collection bin 2.

With each door 3A and 4A there is also associated a loading and compacting member 21 of known type driven by hydraulic cylinder-piston systems.

When the doors 3A and 4A have been closed onto the bin 2 they are retained and secured in that position by hydraulic locking devices 23 comprising cylinders rigid with the bin 2 or with other fixed parts of the vehicle and housing movable pins which when the doors 3A and 4A are closed cooperate with elements of suitable shape (eg. of sleeve or eyelet form) rigid with the doors.

All the hydraulic devices provided on the vehicle form part of a hydraulic circuit comprising known members such as pumps and valves, together with bypass lines to enable the devices

associated with each chamber 3 and 4 to be operated at different times, and in particular enable the two doors 3A and 4A to be opened (or closed) independently. Alternatively, two parallel hydraulic circuits can be provided, acting on each group of devices (door raising-closing; expulsion cylinder; locking device) associated with each chamber 3 and 4 of the bin 2.

It will be assumed that the motor vehicle 1 is now to be discharged, having collected the refuse. This collection has been carried out with the refuse undergoing sorting, for example glass having been placed in the chamber 4 of the bin 2 and combustible refuse in the chamber 3.

The door 3A is firstly opened to discharge the chamber 3. This is done by operating a suitable control such as a lever, which acts on the hydraulic circuit to release the pressure of the fluid present in the locking device 23 securing the door 3A to the bin 2, so making it possible to open it. The lifting devices 7 associated with the door 3A in question now begin to operate, this operation being such as to initially lift the arms 14 so rotating them about the pins 20 of the fixed parts 16. The pistons 11 of the devices 7 then begin to retract into their respective cylinders 8 to exert a pulling action on the door 3A, which rises from the bin 2 by rotating about the hinges 19A by which the door 3A is fixed to the upper ends 20A of the bin.

As the door 3A rises, the cylinders 8 rotate about the pins 19, this rotation continuing until the door 3A is completely open. At this point the hydraulic circuit, which is specifically constructed to be able to operate in cascade on the locking devices 23, on the lifting devices 7 and on the expulsion cylinders 6, now operates the expulsion cylinder 6 of the chamber 3 and expel the refuse collected in said chamber.

When this first discharge stage has been completed, the chamber 4 of the bin 2 is discharged in the same manner after opening the door 4A, this discharge taking place either automatically following the first discharge or on receipt of a manual command.

Alternatively the expulsion cylinders 6 can be controlled manually, to allow possible compacting.

When the refuse has been totally discharged in its sorted batches, the refuse collection operator reoperates the pumps of the hydraulic circuit to return the expulsion cylinders to their rest state and reclose the doors 3A and 4A. At this point, by means of known devices provided in the hydraulic circuit, the pressure is discharged from the lifting devices 7 and cylinders 8 towards the locking devices 23 for the doors 3A and 4A, which now operate to secure these latter to the bin 2.

A refuse collection vehicle constructed in accordance with the present invention enables refuse

to be stored during said collection and to be kept separated during discharge.

## 5 Claims

1. A motor vehicle for refuse collection comprising a collection bin (2) divided longitudinally into two chambers (3, 4), characterised by comprising a rear closure door (3A, 4A) associated with each of the two chambers (3, 4), said doors (3A, 4A) being separate from each other and operable independently of each other.

2. A motor vehicle as claimed in claim 1, characterised in that at least one hydraulic lifting device (7) for opening or closing the door (3A, 4A) and at least one hydraulic locking device (23) are associated with each door (3A, 4A).

3. A motor vehicle as claimed in claim 1, characterised in that the doors (3A, 4A) are hinged (at 19A) to the collection bin (2).

4. A motor vehicle as claimed in claim 2, characterised in that each hydraulic lifting device (7) comprises a cylinder (8) hinged to a fixed part (9) rigid with an upper part (10) of the bin (2) and in which there moves a piston (11) hinged at one end (12) to one end (13) of an arm (14), said arm (14) being hinged to a fixed part (16) rigid with the door (3A, 4A).

5. A motor vehicle as claimed in claim 2, characterised in that the hydraulic locking device (23) comprises at least one cylinder in which a pin rigid with the bin (2) or with a fixed part of the motor vehicle (1) moves, and a member cooperating with said pin to secure it rigid with the door (3A, 4A).

6. A motor vehicle as claimed in claim 5, characterised in that the cylinders are two or four in number.

7. A motor vehicle as claimed in claim 1, characterised in that the two chambers (3, 4) of the bin (2) are independent of each other and are separated by a wall (5), each of said chambers (3, 4) being provided with a hydraulic device (6) for discharging the refuse.

8. A motor vehicle as claimed in claims 2 and 7, characterised in that the hydraulic devices (7) for lifting the doors (3A, 4A), the hydraulic devices (23) for locking the doors (3A, 4A) and the hydraulic devices (6) for discharging the refuse are associated with a single hydraulic circuit operating in cascade.

9. A motor vehicle as claimed in claims 2 and 7, characterised in that those hydraulic devices (7) for lifting the doors (3A, 4A), those hydraulic devices (23) for locking the doors (3A, 4A) and those hydraulic devices (6) for discharging the refuse which are associated with each individual chamber

(3. 4) of the collection bin (2) are connected into parallel branches of a hydraulic circuit.

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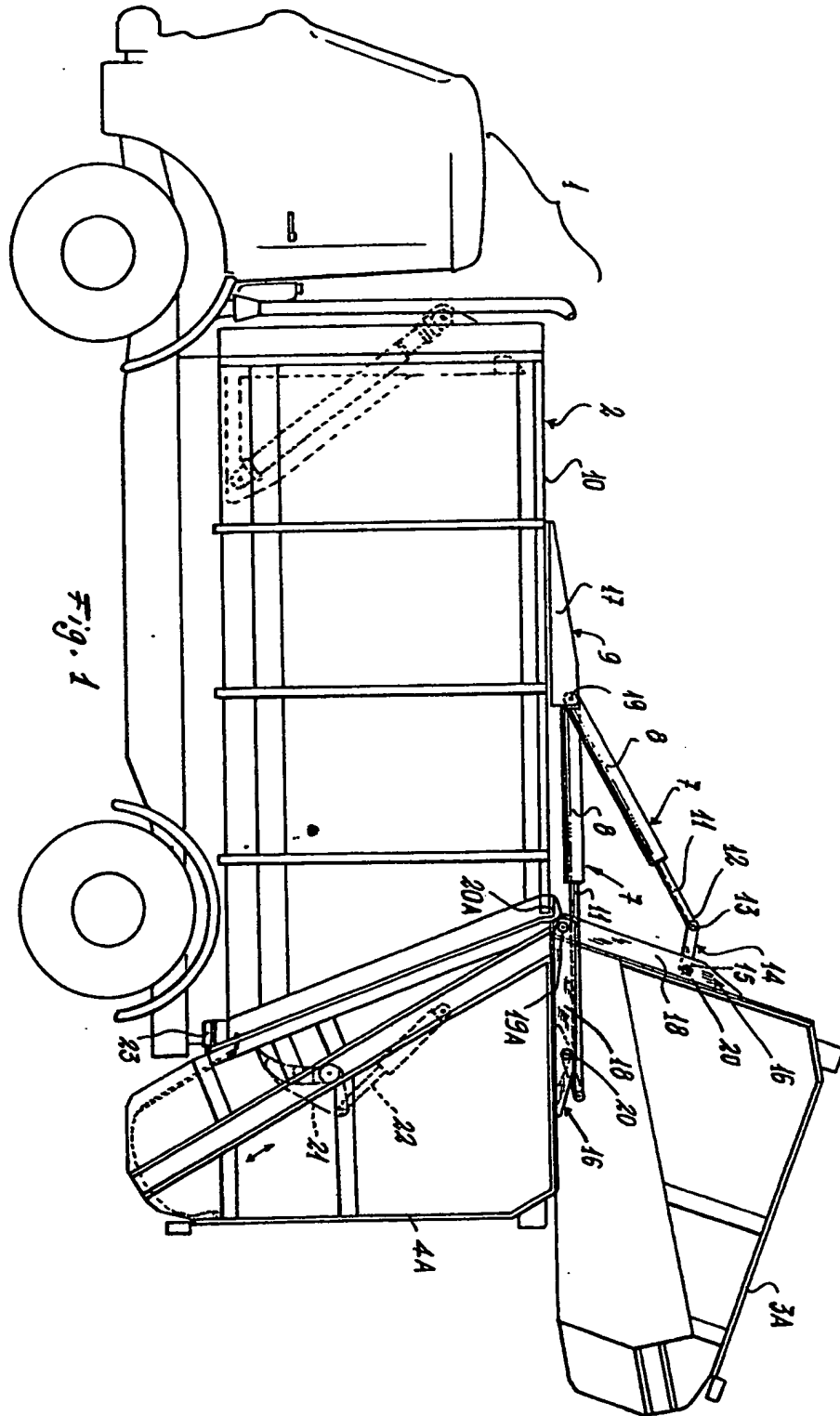
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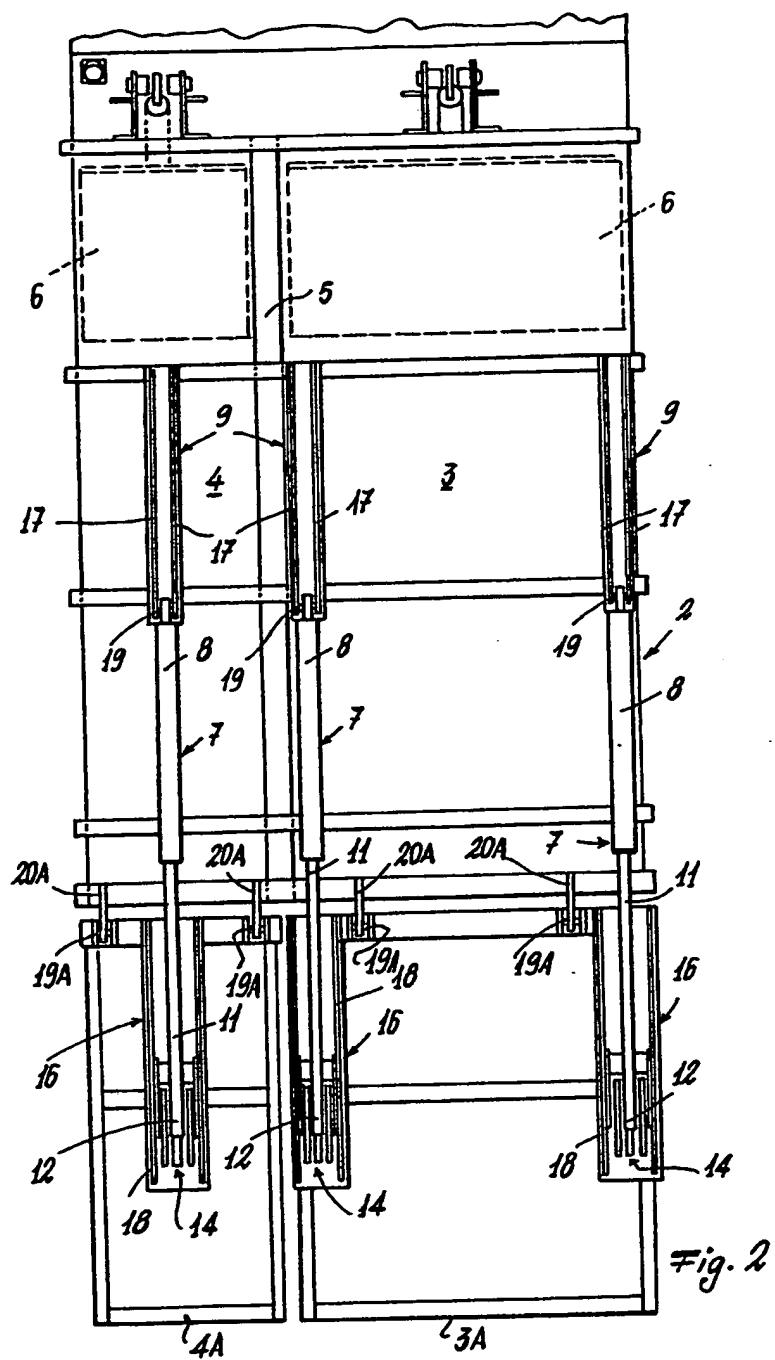
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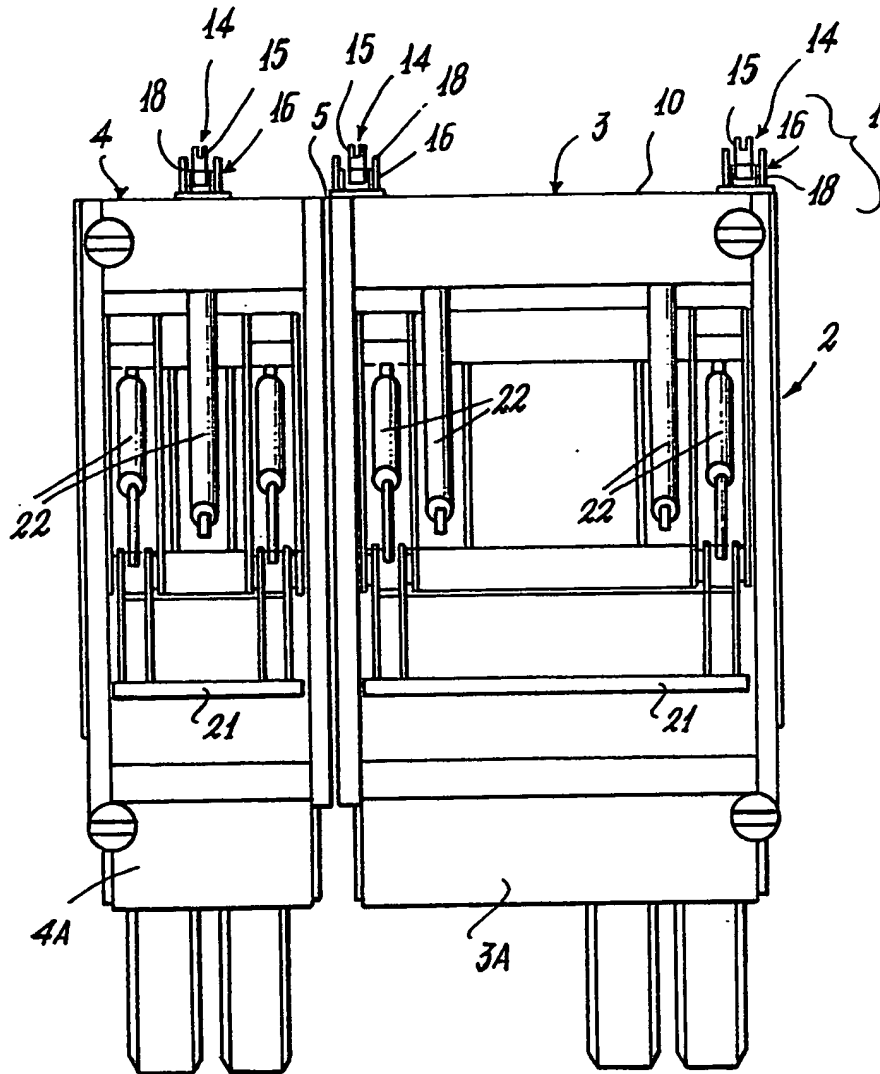


Fig. 3



DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.5)
X	DE-A-3 537 546 (KNIERIM) * Figures 6,7; claims 1-5; column 8, lines 56-61 *	1,3,7	B 65 F 3/00 B 65 F 3/24
Y	---	2,4-6,8 ,9	
Y	GB-A-1 580 459 (BENNES MAREL) * Figures 11,13-16; page 4, lines 38-67 *	2,4-6,8 ,9	
A	FR-A-1 277 511 (SAUER) * Figures 1,2 *	4	
A	GB-A-2 093 902 (ALLEN) * Figure 2; claim 1 *	5	
A	US-A-3 220 586 (GOLLNICK) * Figures 8-12 *	8,9	
A	FR-A-2 336 320 (DORNIER SYSTEM GmbH) -----		
			TECHNICAL FIELDS SEARCHED (Int. Cl.5)
			B 65 F
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 29-11-1989	Examiner DEUTSCH J.P.M.
<b>CATEGORY OF CITED DOCUMENTS</b> X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			